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The effectiveness of laparoscopic burch in diabetic patients

Ramazan Adan, Veli Mihmanlı
Department of Obstetrics and Gynecology, Prof. Dr. Cemil Tascıoglu City Hospital, Istanbul, Turkey

Abstract

Aim: In this study, our aim is to evaluate the effectiveness and surgical outcomes of the laparoscopic (L/S) burch procedure in cases where mesh excision was performed due to mesh erosion in women who have undergone midurethral sling and continue to experience stress urinary incontinence. The primary outcome of this study was the improvement of stress urinary incontinence (SUI) (no symptoms), improvement of stress urinary symptoms in ICIQ-SF, and negative stress test, defined as surgical success with less than 2 grams of urine leakage in a one-hour pad test.

Material and Methods: Eleven patients who underwent mesh excision in the tertiary gynecology unit between 2021 and 2022 were included in the study. Patients who underwent laparoscopic burch were assessed in the postoperative period with a stress test and a one-hour pad test, and they were asked to fill out the International Consultation on Incontinence Questionnaire-Short Form (ICIQ-SF). The follow-up periods were 3, 6, and 12 months postoperatively. The alpha significance level was set at $p < 0.05$.

Results: In postoperative follow-ups, statistically significant improvement was found in terms of the effort test and pad weight in patients with cured stress urinary incontinence ($P < 0.001$). However, in patients who did not show progress after the surgery, no statistical change was observed in ICIQ-SF values ($P = 0.062$).

Discussion: The laparoscopic Burch procedure is a comfortable and safe surgical procedure as a secondary surgery in cases of midurethral sling with mesh excision.

Keywords

Urinary Incontinence, Burch Colposuspension, Minimally Invasive Technique

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Corresponding Author: Ramazan Adan, Department of Obstetrics and Gynecology, Prof. Dr. Cemil Tascıoglu City Hospital, Istanbul, Turkey.
E-mail: radan187@outlook.com P: +90 212 314 55 55
Corresponding Author ORCID ID: https://orcid.org/0000-0002-0605-1533
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Introduction

Stress urinary incontinence (SUI) is described as involuntary urine leakage during activities like exertion, sneezing, or coughing [1]. Among the primary causes of SUI are decreased pelvic floor support, urethral hypermobility, and intrinsic sphincter dysfunction resulting from structural impairment of the urethral sphincter [2]. The popularity of mid-urethral sling procedures has increased over the past twenty years and has become the primary treatment option for SUI in women. Success rates of the minimally invasive technique have been reported to be between 70-95%, and due to its easy use and effectiveness in the short to medium term, it was widely considered the gold standard until recently. One of the most important reasons for this is the ease of application, the minimally invasive approach, and the comparable results when compared to other more extensive procedures like Burch urethropexy [4]. However, with the increased use of synthetic mesh, complications related to its implantation have begun to emerge. One of the most common complications of mesh surgery is the visibility of the mesh in the vagina and dyspareunia. More rare and serious complications include perforations of the bladder, urethra, and intestines [5]. The incidence of mesh erosion in the literature ranges from 0% to 0.6% [6]. Approximately 50% of women who present with symptomatic sling complaints require secondary surgical treatment after less invasive methods (mid-urethral sling) have failed [7]. When conservative measures are insufficient in treating a complication, the surgical removal or revision of the mid-urethral sling (MUS) has been proven to alleviate symptoms associated with some of the complications mentioned above related to the mesh. However, sometimes this situation leaves the patient with recurrent or worsening stress urinary incontinence. The aim of this study is to investigate the surgical outcomes of laparoscopic burch urethropexy for diabetic stress urinary incontinence that requires the removal of mid-urethral sling either vaginally or laparoscopically.

Material and Methods

This prospective cohort study was conducted on 11 diabetic patients whose ages range between 20-70 and who had mid-urethral slings performed for stress incontinence between February 2021 and December 2022 and experienced mesh erosion. The degree of SUI was determined after the initial surgery (first sling implantation) through a 1-hour pad test and cough test.

Patients with detrusor overactivity, urge incontinence, neurogenic bladder, or those with complex prolapse requiring additional surgery were excluded from the study. All patients underwent urodynamic studies after their previous mid-urethral sling surgery. Patients with endocrine abnormalities (such as systemic hypo/hyperthyroidism, hyperprolactinemia, diabetes insipidus, Cushing's syndrome, and congenital adrenal hyperplasia) receiving drug treatment, those with malignancies, a history of pelvic radiotherapy, and known psychiatric issues were also excluded from the study.

All patients included in the study underwent a detailed clinical evaluation, pelvic and abdominal physical examination, and ultrasound assessment. The L/S burch procedure was performed through a 10 mm umbilical port and two suprapubic median 5 mm trocars, and the paravaginal tissues were approximated to the Cooper ligament with nonabsorbable sutures. No gross perioperative or postoperative complications occurred. Catheters were removed 12 hours after surgery.

Patients who underwent laparoscopic burch were evaluated with a stress test and a one-hour pad test in the postoperative period, and they were asked to fill out the International Consultation on Incontinence Questionnaire-Short Form (ICIQ-SF). Follow-up intervals were at 3, 6, and 12 months after surgery. The primary outcome of this study was the surgical success defined as the improvement of SUI (no symptoms), improvement of SUI symptoms in ICIQ-SF, and less than 2g of urine leakage in the stress test and one-hour pad test.

This study was approved by the Ethics Committee of Istanbul Health Sciences University, Prof. Dr. Cemil Tascıoğlu and Clinical Research (Date: 26.12.2022, No: 367). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Statistical Analysis

Statistical analysis was conducted using SPSS software (version 15.0 on Windows). Descriptive statistics included counts and percentages for categorical variables, and for numerical variables, means, standard deviations, minimum, maximum, and medians were reported. Group comparisons for proportions were performed using the Chi-square test. Independent group comparisons for numerical variables were conducted using the Student t-test when the assumption of normal distribution was met and the Mann-Whitney U test when it was not met. The alpha significance level was set at $p < 0.05$.

Results

The characteristic and demographic data of patients who underwent secondary surgery were observed in Table 1.

The average operation duration was 57.1 minutes (ranging from 40 to 88 minutes). Regarding perioperative complications in our patients, one case experienced bladder perforation, and three cases had mesenteric perforation, which were managed laparoscopically during the perioperative period. Three patients had a history of previous abdominal surgeries and cesarean sections. There was no significant bleeding requiring conversion to laparotomy in any of the current patients. In cases with bladder perforation, urinary catheters were removed at postoperative 12 hours for all patients except for those who had a catheter placed on the 7th postoperative day. In one patient who couldn't spontaneously urinate in the postoperative

Table 1. Characteristics of 11 Women Who Underwent Laparoscopic Burch

	Median (25 – 75 Quartile)
Age	60 (55.75, 68)
Parity	2 (2,3)
Body Mass Index	30.95 (27.7, 34.6)
Pre-op Stress Test	1 (1,1)
Pre-op ICIQ-SF	15 (13,19)
Pre-op Pad Weight (g)	130 (90,180)

Pre-op, pre-operative; ICIQ-SF, International Continence Society Incontinence Questionnaire short form.

Table 2. Comparison of the Patients According to 6th Month Stress Test Results

	Negative (n = 9) Median (25% –75%)	Positive (n = 2) Median (25% – 75%)	P Value (Mann Whitney U Test)
Age	51 (47.75, 67)	67.5 (48.5, 70.75)	P > 0.05
Parity	2 (2, 3)	2.5 (1.25, 5.25)	P > 0.05
Body Mass Index	29.95 (27.9, 34.5)	29.2 (27.5, 37.15)	P > 0.05
Pre-op Stress Test	1 (1,1)	1 (1,1)	P > 0.05
Pre-op ICIQ-SF	17 (16,19)	19 (16,21)	P > 0.05
Pre-op Pad Weight	135 (97.5,180)	150 (78.25, 187.5)	P > 0.05
Postop PVR (ml)	26.5 (25, 30)	25 (20, 60)	P > 0.05
Hospitalization (days)	1 (1,2)	1 (1, 1.75)	P > 0.05

Pre-op, pre-operative; ICIQ-SF, International Continence Society Incontinence Questionnaire Short Form; Postop, postoperative; PVR, post void residual urine.

period, clean intermittent catheterization was performed, and symptoms disappeared after one month. One patient developed de novo urge and urgency incontinence, which was completely resolved with anticholinergic treatment at 6 months postoperatively. The average postoperative residual volume and length of hospital stay were 30 mL and 1.5 days, respectively. After surgery, patients were categorized into two groups based on the results at 6 months (urinary incontinence positive and negative). The comparison of surgical outcomes between groups is summarized in Table 2. There was no statistically significant difference between the groups. In follow-up months after surgery, we observed statistically significant improvement in effort test and pad weight (P < .001) in patients with improved stress urinary incontinence. However, in patients who did not improve after surgery, there was no statistically significant change in ICIQ-SF values (P = 0.062).

Discussion

The warning issued by the FDA (Food and Drug Administration) regarding vaginal mesh for prolapse has increased interest in mid-urethral slings and raised questions. This is because complications can arise in early and late stages of stress urinary incontinence surgeries involving mesh. Cases like urinary retention are often considered early complications, while mesh erosion is encountered more as a late complication [8].

In a study involving 188,454 adult women, the risk of mesh revision/removal after nine years of follow-up was relatively low at 3.7%. Most revisions/removals occurred within the first four years following sling surgery, with mesh erosion being the primary indication. The study also found that the risk factors for revision/removal differed for two main indications, and age had a stronger impact on mesh erosion. It was surprising that mesh erosion was more common in younger sexually active women, despite having irregular tissue quality and poorer healing due to urogenital atrophy [9]. In our study, cases requiring mesh excision were in the older age group, possibly influenced by the negative effects of diabetes on tissue regeneration and wound healing due to autonomic factors.

A recent study found that after 10 years, mid-urethral slings had a success rate of 63.3% for both stress urinary incontinence and mixed urinary incontinence, with nearly an 80% improvement rate. Nevertheless, 17.7% of women experienced ongoing symptoms related to sling-associated complications 10 years after surgery [10]. In a multicenter prospective study conducted in the United Kingdom and Ireland, the primary treatment of stress incontinence was compared between tension-free vaginal tape and colposuspension. After a 5-year follow-up, both procedures were found to be similar in terms of urinary incontinence treatment and quality of life improvement, but colposuspension had a higher incidence of posterior vaginal wall prolapse [11]. Our study did not observe de novo enterocoele or cuff prolapse. Results obtained from a meta-analysis indicated that laparoscopic cases had lower morbidity, shorter hospital stays, significantly fewer postoperative complications (RR 0.74, 95% CI 0.58-0.96), less estimated blood loss, and shorter catheterization duration, with the main drawback being longer surgery duration compared to open colposuspension [12]. One limitation of our study was the small patient cohort, and larger prospective randomized studies will strengthen the data on this subject.

Conclusion

LS Burch operation is a comfortable and safe surgical procedure for secondary surgery in mid-urethral sling cases where mesh excision has been performed.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and Human Rights Statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or compareable ethical standards.

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Conflict of Interest

The authors declare that there is no conflict of interest.

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